tic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide. In some embodiments, the epidermal growth factor receptor (EGFR)-specific peptide is QRHKPRE (SEQ ID NO: 1). In some embodiments, the epidermal receptor growth factor 2 (ErbB2)-specific peptide is KSPNPRF (SEQ ID NO: 2).

[0010] In some embodiments, the EGFR-specific peptide and the ErbB2-specific peptide are joined by one or more linkers. In some aspects, the linker is attached at the C-terminus of the EGFR-specific peptide and at the C-terminus of the ErbB2-specific peptide. In some aspects, the linker has a length of about 60 Å. In some aspects, the linker is a peptide, a polyethylene glycol or an aminohexonic acid. In some aspects, the linker is triethyleneglycol (E3).

[0011] In some embodiments, at least one detectable label is attached to a peptide of the heterodimeric peptide. In some aspects, the label is attached to the peptide via a linker. In some aspects, the label is attached to the peptide by a peptide linker. In some aspects, the terminal amino acid of the peptide linker is lysine or a lysine is added at the end of the linker. In some aspects, the label is attached to the peptide by an E3 linker with a terminal lysine at the C-terminus of the E3 linker. In some aspects, the linker comprises the amino acid sequence (GGGSK) SEQ ID NO: 3, the amino acid sequence (GGGAGGG) SEQ ID NO: 28, or the amino acid sequence (GGGAGGGK) SEQ ID NO: 29.

[0012] In some aspects, the label is detectable by microscopy, photoacoustics, ultrasound, or magnetic resonance imaging. In some aspects, the label detectable by microscopy is fluorescein isothiocyanate (FITC). In some aspects, the label detectable by microscopy is Cyanine 5 (Cy5). In some aspects, the label detectable by microscopy is Cyanine 5.5 (Cy5.5). In some aspects, the label detectable by microscopy is near-infrared (NIR) fluorescent dye 800 (IRDye800).

[0013] In some embodiments, at least one therapeutic moiety is attached to the heterodimeric peptide or a peptide monomer of the heterodimeric peptide. In some aspects, the therapeutic moiety is a chemotherapeutic agent. In some aspects, the therapeutic moiety is a micelle or is provided in a micelle. In some aspects, the micelle is an octadecyl lithocholate micelle. In some aspects, the micelle is pegylated. In some aspects, the micelle comprises carboplatin and paclitaxel; cisplatin and 5-fluorouracil (f-FU); ECF: epirubicin (ELLENCE®), cisplatin, and 5-FU; DCF: docetaxel (TAXOTERE®), cisplatin, and 5-FU; cisplatin with capecitabine; oxaliplatin and either 5-FU or capecitabine; and irinotecan. In some aspects, the micelle comprises trastuzumab or ramucirumab.

[0014] In some embodiments, the disclosure provides a composition comprising a reagent comprising a heterodimeric peptide comprising an EGFR-specific peptide and an ErbB2-specific peptide, or a multimeric form of the heterodimeric peptide, wherein the heterodimeric peptide specifically binds to EGFR and ErbB2, and wherein at least one detectable label, or at least one therapeutic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide and a pharmaceutically acceptable excipient.

[0015] In some embodiments, the disclosure provides a method for detecting esophageal adenocarcinoma (EAC), high grade dysplasia (HGD) of the esophagus, or Barrett's neoplasia in a patient comprising the steps of administering a reagent comprising a heterodimeric peptide comprising an epidermal growth factor receptor (EGFR)-specific peptide and an epidermal receptor growth factor 2 (ErbB2)-specific peptide, or a multimeric form of the heterodimeric peptide, wherein the heterodimeric peptide specifically binds to EGFR and ErbB2, and at least one detectable label, or at least one therapeutic moiety, or both, wherein the label, the therapeutic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide to the patient and detecting binding of the reagent to esophageal cells of the patient.

[0016] In some embodiments, the disclosure provides a method of determining the effectiveness of a treatment for EAC, HGD of the esophagus, or Barrett's neoplasia in a patient comprising the step of administering a reagent comprising a heterodimeric peptide comprising an EGFR-specific peptide and an ErbB2-specific peptide, or a multimeric form of the heterodimeric peptide, wherein the heterodimeric peptide specifically binds to EGFR and ErbB2, and at least one detectable label, or at least one therapeutic moiety, or both, wherein the label, the therapeutic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide to the patient, visualizing a first amount of cells labeled with the reagent, and comparing the first amount to a previously-visualized second amount of cells labeled with the reagent, wherein a decrease in the first amount cells labeled relative to the previously-visualized second amount of cells labeled is indicative of effective treatment. In some aspects, the method further comprises obtaining a biopsy of the cells labeled by the reagent.

[0017] In some embodiments, the disclosure provides a method for delivering a therapeutic moiety to EAC cells, HGD cells of the esophagus, or Barrett's neoplastic cells of a patient comprising the step of administering a reagent comprising a heterodimeric peptide comprising an EGFR-specific peptide and an ErbB2-specific peptide, or a multimeric form of the heterodimeric peptide, wherein the heterodimeric peptide specifically binds to EGFR and ErbB2, and at least one detectable label, or at least one therapeutic moiety, or both, wherein the label, the therapeutic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide to the patient.

[0018] In some embodiments, the disclosure provides a kit comprising a composition comprising a reagent comprising a heterodimeric peptide comprising an EGFR-specific peptide and an ErbB2-specific peptide, or a multimeric form of the heterodimeric peptide, wherein the heterodimeric peptide specifically binds to EGFR and ErbB2, and at least one detectable label, or at least one therapeutic moiety, or both, wherein the label, the therapeutic moiety, or both, are attached to the heterodimeric peptide or the multimeric form of the heterodimeric peptide and a pharmaceutically acceptable excipient, and instructions for use of the composition in a patient or cells of a patient. In some aspects, the kit further comprises a device for administering the composition to the patient or to the cells of the patient.

[0019] The disclosure also provides uses of the reagents and uses of the heterodimeric peptides and heterodimeric peptide constructs described herein. In some aspects, these uses include, but are not limited to, diagnostics and treatment.

[0020] Other features and advantages of the disclosure will become apparent from the detailed description provided herein below. It should be understood, however, that the